

within living memory, which has undoubtedly revolutionised ornithology. Perhaps most remarkable is the fact that in this period ornithology has successfully reaffirmed its role as a science — perhaps the last science — in which amateurs as well as professionals can play a creative part, complementing one another's contributions and together giving it a base of matchless breadth and variety. In no country is this demonstrated more fully and convincingly than in Britain, and in no country either is the conservation of birds conducted on a firmer or more comprehensive scientific basis. Other European countries can also show equal achievements to be proud of in advancing modern European ornithology. Yet perhaps the aspect of which all can least be proud is the continuing inadequacy of efforts to combine the strength and to make good the weakness of the component parts of European ornithology.

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Ornithological advances in Western Europe during the last 50 years

by Einhard Bezzel

The development of ornithology in the last decades could not be better described than by the remark of E. Stresemann in his *Ornithology from Aristotle to the Present*: "... the barriers that protected our special field of knowledge were demolished on all sides. Ornithology has progressed with such breathtaking speed that nothing important can be achieved in it nowadays except by keeping up with the pace, without losing sight of the whole."

The amount of knowledge has increased exceedingly even if we only consider the history in Western Europe. With N. Tinbergen and K. Lorenz, ornithology even played a basic part in the award of a Nobel Prize in 1973. Comparative ethology has been one of the new fields in causal research on birds which has become important beyond the barriers of ornithology.

Ethology as a separate scientific discipline started with studies on the behaviour of corvids, gulls or ducks by N. Tinbergen and K. Lorenz, the latter referring to earlier studies of O. Heinroth in the first decade of this century. Pioneer studies of E. Selous, J. S. Huxley or A. Kortland and some others should be mentioned here as well. Nowadays we find many aspects of bird behaviour studied by the aid of complicated techniques, such as the analysis of the great diversity of behaviour patterns, the description and analysis of bird songs and their function (e.g. E. A. Armstrong, W. H. Thorpe, G. Thielcke), or studying the way in which birds use food resources, construct their nests, act and react against enemies or competitors, etc. The result of such studies provides many new ideas for the understanding of how evolution works or how birds are adapted to their environment.

In many fields of ornithology the pioneer work of single ingenious and enlightened persons has built the basis for modern research methods, which are characterized by the teamwork of scientists and ever increasing help from new techniques in both the laboratory and in the field. Ornithology in different countries and regions has been encouraged and developed, in fact, mainly by a few ornithologists who initiated a rich and thorough research, even in those regions with a poorly developed ornithological tradition.

In 1969 the Sociedad Española de Ornitología celebrated its 15th anniversary in a special volume of the journal *Ardeola*, honouring in addition its first Secretary General, F. Bernis. Some years later Bernis edited the special volume of *Ardeola* honouring A. Valverde, another great pioneer of ornithology and field zoology in Spain, while many fascinating papers on ecology and distribution of birds are published nowadays by young Spanish ornithologists. In Italy the names of E. Moltoni and A. Toschi must be mentioned in regard to thorough long term systematic and faunistic research, still being continued. Inseparably linked with the development of ornithology are the names of N. Mayaud, H. Heim de Balsac, H. Jouard in France, the Schifferlis (now in the third generation!) in Switzerland, F. Salomonsen in Denmark and in the Arctic, F. Gudmundsson in Iceland, to mention only a few.

From time to time single ornithologists have tried to give a comprehensive synopsis of ornithological knowledge. At the beginning of the period covered here, E. Hartert prepared the ground for a modern view of intra-specific variation by the use of the trinominal system of nomenclature in his "Handbook" (1903–1922). Following in the tradition of Hartert's outstanding systematic work we come to Vaurie's *Birds of the Palearctic Fauna* (2 vols, 1959, 1965) and to the *List of Recent Holarctic Bird Species* by K. H. Voous (*Ibis* 1973, 1977). With his *Atlas of European Birds* (1960) the latter stimulated, beyond just systematic surveys, modern research on the distribution, systematics, evolution and ecology of European birds. Among the most important publications listing the birds of Europe or the Western Palaearctic, the successful modern field guides should not be forgotten starting with the first edition of the classic work of R. T. Peterson, G. Mountfort and P. A. D. Hollom in 1954, now translated into nearly all European languages and issued in many revised editions.

The modern approach of a handbook covering not only systematics, description and distribution but also behaviour, breeding habits, ecology, etc. reached a first culmination in the 1930s when H. F. Witherby and G. Niethammer published their famous works on British and German birds respectively. The use of teamwork they practised has led to the voluminous projects of our days, such as the handbooks of the birds of Middle Europe or of the Western Palaearctic. In giving a comprehensive survey of ornithology as a part of biological sciences, Stresemann's *Aves* (1927–1934) set a standard which has hardly been reached so far. Only once since has a similar attempt at a synopsis of all parts of ornithology in a single volume appeared in Europe – the excellent volume *Oiseaux* in the *Traité de Zoologie* edited by P. P. Grassé (in collaboration with J. Berlioz, N. Mayaud, A. Portmann and others). In a time of "ramification and interconnection" (E. Stresemann) an encyclopaedic summary of ornithology gave rise to the *New Dictionary of Birds* edited by Sir A. Landsborough Thomson in 1964, of which a new edition is now in preparation.

If we look at the most important publications reflecting the work of ornithologists in Western Europe which have produced the biggest impact on ornithological thought we must not forget papers and books on single topics such as life histories of single species. British ornithologists were leading in this field for a long time beginning with D. Lack and his *Life of the Robin* in the early 40's. Meanwhile, similar comprehensive monographs

of many species (e.g. White Stork, Swift, Alpine Swift, Blackbird, some waders, colonially breeding seabirds, etc.) have stimulated further experimental work to evaluate the factors which control population size and growth, so that some bird species have become classical examples to demonstrate problems of population ecology, predator-prey-systems, community structure or evolution strategies, etc. both in theory and practice.

Right up to modern times, ringing (banding) has remained a symbol of co-operation between amateurs and professionals; it has always been a fundamental motive power in ornithology, giving most important help in learning about bird migration. Migration of different populations rather than of different species focus the interest today, and a milestone in this field is the atlas of recoveries by G. Zink. The increasing number of ringed birds and recoveries as a result of improved catching techniques and well co-ordinated ringing programmes in many countries has led to international co-ordination in the Euring scheme. In addition, by using radar, bird migration now can be watched very exactly even during night and in bad weather conditions. In 1967 the first book on "Radar Ornithology" was written by E. Eastwood.

Last but not least, modern techniques and a sophisticated statistical approach have penetrated a field of work originated by amateurs: population studies and bird census programmes, the former linked jointly with the names of D. Lack and H. N. Kluijver, with hole nesting song birds as the preferred "subjects". The tits (Paridae) around Oxford, Braunschweig, Steckby, as well as those in Belgium, in the Netherlands or Southwest Germany, to mention only some well known study areas, have provided generations of ornithologists with copious material for detailed studies, which are partially summarised in books by D. Lack, H. Löhrl and C. Perrins.

Many problems are still unsolved. For some time the research in some fields seemed to reach a dead end, until new techniques for experimental work were available. This was the case in the study of bird flight, which now has got new impulses mainly by the work of H. Oehme, W. Nachtigall, G. Rüppell and others. The same holds true with the many attempts to explain the compass orientation of birds and how they navigate. The demonstration of the sun compass by G. Kramer in 1950, the successful work to prove the existence of a magnetic compass used by birds by W. Merkel and especially by W. Wiltschko, or the discovery of the bird's ability to use stars for directional reference at night by F. Sauer, mark some well known steps of progress in this field in which today teams in several countries are working with great effort. Each new result raises new questions and so we are still far away from understanding sufficiently how birds navigate.

The fascinating results of research on circannual and circadian rhythms in birds and on the internal clock which is controlled by external stimuli ("Zeitgeber"), has animated the work on orientation, migration, moulting and breeding cycles as well.

The advances in field studies and bird census programmes have removed nearly all blank spots on distribution maps within Western Europe. Furthermore they have instigated many quantitative studies which enable us to calculate population trends in many species and to point out priorities for conservation management. With the modern atlas work, starting with the gigantic project of the *Atlas of Breeding Birds in Britain and Ireland*, followed by similar publications in France and Denmark and still others in progress in

other countries, a new era of our knowledge of bird distribution has begun.

Atlas projects, monitoring and bird census programmes, migration studies, etc. have led to international working groups, committees or similar instruments of cooperation, which, besides the established international societies and councils (such as the ICBP and its many national sections), nowadays play an important role in ornithological research and bird protection as well. May these activities not only advance ornithological research but also improve the chance of survival for birds in Western Europe.

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Some trends in ornithology in East European Countries during the last fifty years

by Z. Bochenski

In the last half-century noticeable progress was made in ornithology in East European countries despite the setback and, in some of them, even complete stoppage of scientific activities brought about by World War II. In addition to the journals *Aquila* (Budapest) and *Berichte des Vereins Schlesischer Ornithologen* (Breslau), which had been started some time before, new periodicals began to appear in the thirties. They are *Moravsky Ornitholog = Ceskoslovensky Ornitholog* (published at Prerov from 1934 to 1949), the continuation of which is *Zpráwy MOS*; then *Acta Ornithologica Mus. Zool. Polon.* (Warsaw, since 1934); *Sylvia* (Praha, since 1936); *Beiträge zur Vogelkunde* (Leipzig, since 1949); *Larus* (Zagreb, since 1947); *Der Falke* (Berlin, since 1954); and *Notatki Ornitologiczne* (Warsaw, later Wroclaw, since 1960), not to mention irregularly appearing smaller ephemerals.

Ornithological studies have also been published in other zoological periodicals, of which I shall name only some: *Acta Zoologica Cracoviensis* (Kraków); *Przeglad Zoologiczny* (Wroclaw); *Ekologia Polska* (Warsaw); *Zoologicke Listy* (Brno); *Biologia* (Bratislava); *Biologicke Prace* (Bratislava); *Vertebrata Hungarica* (Budapest); *Zoologische Abhandlungen . . .* (Dresden); *Travaux du Museum d'Hist. Nat. "Gr. Antipa"* (Bucarest); *Comunicari de Zoologie* (Bucarest); *Tibiscus* (Bucarest); and *Bulletin de l'Institut de Zoologie et Musée* (Sophia). Hundreds of papers appearing every year cover all the divisions of ornithology, and their discussion would take far more room than provided for in a short note; therefore I shall confine myself to several chosen divisions with which I am more closely concerned, omitting the remaining ones entirely. I hope that none of the ornithologists working in these last fields will take this amiss.

Faunistic studies which have been carried out in all the countries being discussed, although with fluctuating intensity, in these last decades were undoubtedly influenced by successive editions of the field guide by Peterson, Mountfort & Hollom and that by Makatsch (1969). The first major faunistic monograph that appeared in the German Democratic Republic (GDR) (I omit all the German publications prior to 1945) was that of birds in Saxony by Heyder (1952). A monograph of the birds of Mecklenburg, edited by Klaafs